SRM Supplier: National Institute of Standards and Technology SRM Number: 3090 (Set)

Standard Reference Materials Program

MSDS Number: 3090 (Set)

100 Bureau Drive, Mail Stop 2321 SRM Name: Aroclors in Transformer

Gaithersburg, Maryland 20899 Oil
Date of Issue: 23 May 2003

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The material safety data sheet for SRM 3090 consecutively consists of a set six MSDSs. This Standard Reference Material (SRM) is a set of six different solutions of individual Aroclors in transformer oil and consists of six 2-mL ampoules, each containing approximately 1.2 mL of each of the following SRMs:

SRM 3075 Aroclor 1016 in Transformer Oil

SRM 3076 Aroclor 1232 in Transformer Oil

SRM 3077 Aroclor 1242 in Transformer Oil

SRM 3078 Aroclor 1248 in Transformer Oil

SRM 3079 Aroclor 1254 in Transformer Oil

SRM 3080 Aroclor 1260 in Transformer Oil

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3075 Aroclor 1016 in Transformer Oil

Description: SRM 3090 consists of one 2-mL ampoule of SRM 3075, containing approximately 1.2 mL of a solution of aroclor 1016 in transformer oil.

Other Designations: Aroclor 1016 (PCB 1016; polychlornated biphenyl (aroclor 1016); chlorodiphenyl (41 % Cl)) in **Transformer Oil** (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

NameChemical FormulaCAS Registry NumberTransformer Oilcomplex mixture64742-53-6Aroclor 1016complex molecule12674-11-2

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5g/kg body weight
Aroclor 1016	1	ACGIH TWA: 1 μg/m³ (skin)
		MEL TWA: 0.1 mg/m³ (skin)
		Rat, Oral: LD ₅₀ : 2300 mg/kg
		Rat, Oral: TD _{LO} : 21 mg/kg/21 days (intermittent)

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Transformer Oil	Aroclor 1016
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a clear, oily liquid; odor not available
Relative Molecular Mass: ~ 255	Relative Molecular Mass: complex molecule
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.36 to 1.37
Boiling Point: ~ 238 °C	Boiling Point: 323 °C to 356 °C
Freezing Point: not available	Freezing Point: not available
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure (@ 25°C): 0.004 mmHg
Evaporation Rate: not available	Evaporation Rate: not available
Viscosity (@ 40 °C): 12.0 cSt	Viscosity (@ 20 °C): 71 to 81 SUS
Water Solubility: insoluble	Water Solubility: very slightly soluble
Solvent Solubility: not available	Solvent Solubility: soluble in oils, organic solvents

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1016 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1016

Flash Point: >141 °C Method Used: Not Available Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1016 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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SECTION V. REACTIVITY DATA							
Stability:	X	Stable		Unstable			
Conditions to Avvapors or combus sources.							
Incompatibility (oxidizing agents.	Materia	ls to Avoid):	: Transformer	oil is a fire and	explosion haz	ard when expo	osed to strong
Aroclor 1016 is in	compatib	le with oxidi	zing materials ar	nd combustible ma	aterials.		
See Section IV: U	Inusual F	Fire and Explo	osion Hazards				
Hazardous Deco							
Thermal decomposition halogenated composition		roducts of a	roclor 1016 ma	ay include acid	halides, chlor	rine, oxides of	carbon, and
Hazardous Polyn	nerizatio	n	Will O	ccur	X	_ Will Not Oc	cur
SECTION VI. HEALT	H HAZAF	RD DATA					
Route of Entry:		X Inha	lation	X	Skin	X	Ingestion
Transformer Oil: The vapor pressure of this material is very low therefore, vapor inhalation under ambient conditions is normally not a problem. However, health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.							
Prolonged or repeated skin contact with this product may remove skin oils possibly leading to irritation and dermatitis; contact with the eyes may cause eye irritation. Repeated application of mildly hydrotreated oils to the skin of mice induced a moderate incidence of skin tumors. This product has a low order of oral toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.							
PCB 1016 (Aroclor): PCBs show high levels of bio-accumulation in the fatty tissues with very slow metabolism, especially for pentachloride (Cl) ₅ compounds and above. The skin lesions consist of small pimples and, in the initial stages, dark pigmentation of the exposed pores. In the later stages, blackheads and pustules develop. The PCBs are potent liver toxins that can be absorbed through the skin in hazardous amounts without immediately discernible pain or discomfort. This liver toxicity of chlorinated biphenyls appears to be increased if there is exposure to carbon tetrachloride at the same time. Where liver damage is extensive, the patient may become comatose and die. The higher the chlorine content of the diphenyl compound, the more probable it is toxic.							
Medical Conditions Generally Aggravated by Exposure: Methanol may affect eye disorders, kidney disorders, skin disorders, and allergies. Aroclor 1016 may affect liver disorders, skin disorders, and allergies.							
Listed as a Carci	nogen/Po	otential Carc	inogen (Transf	ormer Oil):			
In the Internation	onal Age	ncy for Resea	(NTP) Report on arch on Cancer (In the Administration	IARC) Monograp	hs X	X	_ _ _

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1016):

In the National Toxicology Program (NTP) Report on Carcinogens

In the International Agency for Research on Cancer (IARC) Monographs

By the Occupational Safety and Health Administration (OSHA)

Yes	No
X	
X	
	X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1016: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3076 Aroclor 1232 in Transformer Oil

Description: SRM 3090 consists of one 2-mL ampoule of SRM 3076, containing approximately 1.2 mL of a

solution of aroclor 1232 in transformer oil.

Other Designations: Aroclor 1232 (PCB 1254; polychlornated biphenyl (aroclor 1232); chlorodiphenyl (32 % Cl)

in Transformer Oil (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

Name Chemical Formula CAS Registry Number

Transformer Oil complex mixture 64742-53-6 Aroclor 1232 complex molecule 11141-16-5

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5g/kg body weight
Aroclor 1232	1	NIOSH TWA: 1 μg/m³ (10 hours)
		Rat, Oral: LD ₅₀ : 4 470 mg/kg
		Rabbit, Skin: LD _{LO} : 2 g/kg

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Transformer Oil	Aroclor 1232
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a colorless liquid; odor not available
Relative Molecular Mass: ~ 255	Relative Molecular Mass: complex molecule
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.24
Boiling Point: ~ 238 °C	Boiling Point: 290 °C to 325 °C
Freezing Point: not available	Freezing Point: not available
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure (@ 20 °C): 0.004 mm Hg
Evaporation Rate: not available	Evaporation Rate: not available
Viscosity (@ 40 °C): 12.0 cSt	Viscosity (@ 20 °C): 44 to 51
Water Solubility: insoluble	Water Solubility: very slightly soluble
Solvent Solubility: not available	Solvent Solubility: soluble in oils and organic solvents

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1232 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1232

Flash Point: 238 °C Method Used: Not Available Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1232 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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SECTION V. REACTIVITY DATA			
	Stability: X Stable Unstable		
	Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Avoid contact with the skin. DO NOT allow the material to contaminate water sources.		
	Incompatibility (Materials to Avoid): Transformer oil is a fire and explosion hazard when exposed to strong oxidizing agents.		
	Aroclor 1232 is incompatible with acid halides, chlorine, oxides of carbon, and halogenated compounds.		
	See Section IV: Unusual Fire and Explosion Hazards		
	Hazardous Decomposition or Byproducts: Transformer oil will produce fumes, smoke, carbon monoxide, sulfur oxides, and aldehydes along with other decomposition products can be produced with incomplete combustion.		
	Thermal decomposition products of aroclor 1232 may include acid halides, chlorine, oxides of carbon, and halogenated compounds.		
	Hazardous Polymerization Will Occur X Will Not Occur		
SE	CTION VI. HEALTH HAZARD DATA		
	Route of Entry: X Inhalation X Skin X Ingestion		
	Transformer Oil: The vapor pressure of this material is very low therefore, vapor inhalation under ambient conditions is normally not a problem. However, health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.		
	Prolonged or repeated skin contact with this product may remove skin oils possibly leading to irritation and dermatitis; contact with the eyes may cause eye irritation. Repeated application of mildly hydrotreated oils to the skin of mice induced a moderate incidence of skin tumors. This product has a low order of oral toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.		
	PCB 1232 (Aroclor): PCBs show high levels of bio-accumulation in the fatty tissues with very slow metabolism, especially for pentachloride (Cl) ₅ compounds and above. The skin lesions consist of small pimples and, in the initial stages, dark pigmentation of the exposed pores. In the later stages, blackheads and pustules develop. The PCBs are potent liver toxins that can be absorbed through the skin in hazardous amounts without immediately discernible pain or discomfort. This liver toxicity of chlorinated biphenyls appears to be increased if there is exposure to carbon tetrachloride at the same time. Where liver damage is extensive, the patient may become comatose and die. The higher the chlorine content of the diphenyl compound, the more probable it is toxic.		
	Medical Conditions Generally Aggravated by Exposure: Methanol may affect eye disorders, kidney disorders, skin disorders, and allergies. Aroclor 1232 may affect liver disorders, skin disorders, and allergies.		
	Listed as a Carcinogen/Potential Carcinogen (Transformer Oil):		
	In the National Toxicology Program (NTP) Report on Carcinogens In the International Agency for Research on Cancer (IARC) Monographs By the Occupational Safety and Health Administration (OSHA) Yes X X		

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1232):

In the National Toxicology Program (NTP) Report on Carcinogens In the International Agency for Research on Cancer (IARC) Monographs By the Occupational Safety and Health Administration (OSHA)

Yes	No
X	
X	
	X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1232: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3077 Aroclor 1242 in Transformer Oil

Description: SRM 3090 consists of one 2-mL ampoule of SRM 3077, containing approximately 1.2 mL of a solution of aroclor 1242 in transformer oil.

Other Designations: Aroclor 1242 (PCB 1242; polychlornated biphenyl (aroclor 1242); chlorodiphenyl (42 % Cl)) in **Transformer Oil** (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

NameChemical FormulaCAS Registry NumberTransformer Oilcomplex mixture64742-53-6Aroclor 1242complex molecule53469-21-9

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5g/kg body weight
Aroclor 1242	1	ACGIH TWA (skin): 1 mg/m ³
		OSHA TWA (skin): 1 mg/m ³
		Human, Inhalation: TC _{LO} : 10 mg/m ³
		Rat, Oral: LD ₅₀ : 4 250 mg/kg

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Transformer Oil	Aroclor 1242
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a colorless to pale viscous liquid with a distinct odor
Relative Molecular Mass: ~ 255	Relative Molecular Mass: complex molecule
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.24
Boiling Point: ~ 238 °C	Boiling Point: 325 °C – 366 °C
Freezing Point: not available	Freezing Point: not available
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure (@ 20 °C): 0.001 mm Hg
Evaporation Rate: not available	Evaporation Rate (butyl acetate = 1): <1.0
Viscosity (@ 40 °C): 12.0 cSt	Viscosity (@ 20 °C): 82 SUS – 92 SUS
Water Solubility: insoluble	Water Solubility: very slightly soluble
Solvent Solubility: not available	Solvent Solubility: soluble in oils and organic solvents

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1242 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1242

Flash Point: 176 °C – 180 °C Method Used: Closed Cup Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1242 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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SECTION V. REACTIVITY DATA		
Stability: X Stable Unstable		
Conditions to Avoid: Avoid contact with heat, sparks, flames, or o vapors or combustion by-products. Avoid contact with the skin. DO sources.		
Incompatibility (Materials to Avoid): Transformer oil is a fire ar oxidizing agents.	nd explosion hazard when exposed to strong	
Aroclor 1242 is incompatible with oxidizing and combustible materials	S.	
See Section IV: Unusual Fire and Explosion Hazards		
Hazardous Decomposition or Byproducts: Transformer oil will products, and aldehydes along with other decomposition products can be		
Thermal decomposition products of aroclor 1242 may include ach halogenated compounds.	id halides, chlorine, oxides of carbon, and	
Hazardous Polymerization Will Occur	X Will Not Occur	
SECTION VI. HEALTH HAZARD DATA		
Route of Entry: X Inhalation X SI	kin <u>X</u> Ingestion	
Transformer Oil: The vapor pressure of this material is very low therefore, vapor inhalation under ambient conditions is normally not a problem. However, health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized. Prolonged or repeated skin contact with this product may remove skin oils possibly leading to irritation and dermatitis; contact with the eyes may cause eye irritation. Repeated application of mildly hydrotreated oils to the skin of mice induced a moderate incidence of skin tumors. This product has a low order of oral toxicity, but minute		
amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.		
PCB 1242 (Aroclor): PCBs show high levels of bio-accumulation in the fatty tissues with very slow metabolism, especially for pentachloride (Cl) ₅ compounds and above. The skin lesions consist of small pimples and, in the initial stages, dark pigmentation of the exposed pores. In the later stages, blackheads and pustules develop. The PCBs are potent liver toxins that can be absorbed through the skin in hazardous amounts without immediately discernible pain or discomfort. This liver toxicity of chlorinated biphenyls appears to be increased if there is exposure to carbon tetrachloride at the same time. Where liver damage is extensive, the patient may become comatose and die. The higher the chlorine content of the diphenyl compound, the more probable it is toxic.		
Medical Conditions Generally Aggravated by Exposure: Methanol may affect eye disorders, kidney disorders, skin disorders, and allergies. Aroclor 1242 may affect liver disorders, skin disorders, and allergies.		
Listed as a Carcinogen/Potential Carcinogen (Transformer Oil):	Yes No	
In the National Toxicology Program (NTP) Report on Carcinogens In the International Agency for Research on Cancer (IARC) Monograms By the Occupational Safety and Health Administration (OSHA)	raphs X X	

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1232):

In the National Toxicology Program (NTP) Report on Carcinogens In the International Agency for Research on Cancer (IARC) Monographs By the Occupational Safety and Health Administration (OSHA)

Yes	No
X	
X	
	X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1242: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3078 Aroclor 1248 in Transformer Oil

Description: SRM 3090 consists of one 2-mL ampoule of SRM 3078, containing approximately 1.2 mL of a solution of aroclor 1248 in transformer oil.

Other Designations: Aroclor 1248 (PCB 1248; polychlornated biphenyl (aroclor 1248); chlorodiphenyl (48 % Cl)) in **Transformer Oil** (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

NameChemical FormulaCAS Registry NumberTransformer Oilcomplex mixture64742-53-6Aroclor 1248complex molecule12672-29-6

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data	
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)	
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight	
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5 g/kg body weight	
Aroclor 1248	1	NIOSH TWA: 1 μg/m³ (10 h)	
		Rat, Oral: LD ₅₀ : 11 g/kg	
		Rabbit, Skin: LD _{LO} : 1 269 mg/kg	

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Transformer Oil	Aroclor 1248	
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a yellow to green free flowing liquid; odor not available	
Relative Molecular Mass: ~ 255	Relative Molecular Mass: complex molecule	
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.45 to 1.47	
Boiling Point: ~ 238 °C	Boiling Point: 340 °C to 375 °C	
Freezing Point: not available	Freezing Point: not available	
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure (@ 20 °C): negligible	
Evaporation Rate: not available	Evaporation Rate (butyl acetate = 1): not available	
Viscosity (@ 40 °C): 12.0 cSt	Viscosity (@ 20 °C): 185 SUS to 240 SUS	
Water Solubility: insoluble	Water Solubility: very slightly soluble	
Solvent Solubility: not available	Solvent Solubility: soluble in oils and organic solvents	

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1248 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1016

Flash Point: >340 °C Method Used: Not Available Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1248 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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SECTION V. REACTIVITY DATA			
Stability: X Stable Unstable			
Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sou vapors or combustion by-products. Avoid contact with the skin. DO NOT al sources.			
Incompatibility (Materials to Avoid): Transformer oil is a fire and explooxidizing agents.	osion hazard w	when exposed to strong	
Aroclor 1248 is incompatible with oxidizing materials and combustible materia	als.		
See Section IV: Unusual Fire and Explosion Hazards			
Hazardous Decomposition or Byproducts: Transformer oil will produce fu oxides, and aldehydes along with other decomposition products can be produced.			
Thermal decomposition products of aroclor 1248 may include acid halid halogenated compounds.	les, chlorine,	oxides of carbon, and	
Hazardous Polymerization Will Occur	W	'ill Not Occur	
SECTION VI. HEALTH HAZARD DATA			
Route of Entry: X Inhalation X Skin		X Ingestion	
Transformer Oil: The vapor pressure of this material is very low there conditions is normally not a problem. However, health studies have shown the synthetic lubricants pose potential human health risks which may vary from exposure to liquids, vapors, mists, or fumes should be minimized. Prolonged or repeated skin contact with this product may remove skin of dermatitis; contact with the eyes may cause eye irritation. Repeated applicates skin of mice induced a moderate incidence of skin tumors. This product has a amounts aspirated into the lungs during ingestion or vomiting may cause a possibly death.	hat many petron person to	bleum hydrocarbons and erson. As a precaution, eading to irritation and hydrotreated oils to the oral toxicity, but minute	
PCB 1248 (Aroclor): PCBs show high levels of bio-accumulation in the fat especially for pentachloride (Cl) ₅ compounds and above. The skin lesions con stages, dark pigmentation of the exposed pores. In the later stages, blackhead potent liver toxins that can be absorbed through the skin in hazardous amounts or discomfort. This liver toxicity of chlorinated biphenyls appears to be interachloride at the same time. Where liver damage is extensive, the patient higher the chlorine content of the diphenyl compound, the more probable it is	sist of small pi s and pustules s without imme creased if there t may become	imples and, in the initial develop. The PCBs are ediately discernible pain re is exposure to carbon	
Medical Conditions Generally Aggravated by Exposure: Transformer oil skin disorders, and allergies.	l may aggravat	te respiratory disorders,	
Aroclor 1248 may affect liver disorders, skin disorders, and allergies.			
Listed as a Carcinogen/Potential Carcinogen (Transformer Oil):			
In the National Toxicology Program (NTP) Report on Carcinogens	Yes	No X	
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>		
By the Occupational Safety and Health Administration (OSHA)		X	

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1248):

In the National Toxicology Program (NTP) Report on Carcinogens

In the International Agency for Research on Cancer (IARC) Monographs

By the Occupational Safety and Health Administration (OSHA)

Yes

X

X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1248: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3079 Aroclor 1254 in Transformer Oil

Description: SRM 3079 consists of five 2-mL ampoules, containing approximately 1.2 mL of a solution of aroclor 1254 in transformer oil.

Other Designations: Aroclor 1254 (PCB 1254; polychlornated biphenyl (aroclor 1254); chlorodiphenyl (54 %) Cl) in **Transformer Oil** (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

Name Chemical Formula CAS Registry Number

Transformer Oil complex mixture 64742-53-6 Aroclor 1254 complex molecule 11097-69-1

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data	
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)	
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight	
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5 g/kg body weight	
Aroclor 1254	1	ACGIH TWA: 0.5 mg/m ³ (skin)	
		OSHA TWA: 0.5 mg/m³ (skin)	
		Rat, Oral: LD ₅₀ : 1 010 mg/kg	
		Rat, Intravenous: LD ₅₀ : 358 mg/kg	

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Transformer Oil	Aroclor 1254	
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a colorless to yellow liquid with a distinct odor	
Relative Molecular Mass: ~ 255	Relative Molecular Mass: complex molecule	
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.50	
Boiling Point: ~ 238 °C	Boiling Point: 365 °C to 390 °C	
Freezing Point: not available	Freezing Point: 10 °C	
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure: negligible	
Evaporation Rate: not available	Evaporation Rate (butyl acetate = 1): not available	
Viscosity (@ 40 °C): 12.0 cSt	Viscosity (@ 20 °C): 140 to 2500	
Water Solubility: insoluble	Water Solubility: very slightly soluble	
Solvent Solubility: not available Solvent Solubility: soluble in oils, solvents		

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1254 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1254

Flash Point: 222 °C Method Used: Closed Cup Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1254 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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ECTION V. REACT	IVITY DATA			
Stability:	X Stable	Unstable		
		with heat, sparks, flames, or other solvid contact with the skin. DO NOT a		
Incompatibility oxidizing agents.		Transformer oil is a fire and expl	osion hazard w	hen exposed to strong
Aroclor 1254 is i	ncompatible with acid h	nalides, chlorine, oxides of carbon, and	d halogenated c	ompounds.
See Section IV:	Unusual Fire and Explo	osion Hazards		
		ucts: Transformer oil will produce for decomposition products can be product		
Thermal decomp		roclor 1254 may include acid halid	des, chlorine,	oxides of carbon, and
Hazardous Poly	merization	Will Occur	Wi	ill Not Occur
ECTION VI. HEAL	TH HAZADD DATA			
ECTION VI. HEAL	III IIAZARD DATA			
Route of Entry:	X Inha	lation X Skin		X Ingestion
conditions is not synthetic lubrica	rmally not a problem. I	re of this material is very low there However, health studies have shown than health risks which may vary from the should be minimized.	that many petro	leum hydrocarbons and
dermatitis; conta skin of mice ind	act with the eyes may cuced a moderate incider	rith this product may remove skin cause eye irritation. Repeated applicance of skin tumors. This product has any ingestion or vomiting may cause	ation of mildly lation of of contract of c	hydrotreated oils to the oral toxicity, but minute
especially for perinitial stages, da PCBs are potent discernible paint exposure to carl comatose and di	entachloride (Cl) _{5 1q} conrk pigmentation of the t liver toxins that can or discomfort. This bon tetrachloride at the e. The higher the chlor stion studies of aroclor	h levels of bio-accumulation in the fan pounds and above. The skin lesion exposed pores. In the later stages, to be absorbed through the skin in har liver toxicity of chlorinated bipheny e same time. Where liver damage in in a content of the diphenyl compound 1254, involving rats, produced decrea	s consist of sm blackheads and zardous amount ls appears to b is extensive, th d, the more prol	nall pimples and, in the pustules develop. The ts without immediately be increased if there is the patient may become bable it is toxic. Acute
		vated by Exposure: Methanol may 242 may affect liver disorders, skin dis		
Listed as a Caro	cinogen/Potential Card	einogen (Transformer Oil):	**	
In the Nationa	1 Toxicology Program ((NTP) Report on Carcinogens	Yes	No X
		rch on Cancer (IARC) Monographs	<u>X</u>	<u> </u>
	ational Safety and Healt			

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1254):

In the National Toxicology Program (NTP) Report on Carcinogens In the International Agency for Research on Cancer (IARC) Monographs By the Occupational Safety and Health Administration (OSHA)

Yes	No
<u>X</u>	
X	
	X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1254: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

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SECTION I. MATERIAL IDENTIFICATION

Material Name: SRM 3090/SRM 3080 Aroclor 1260 in Transformer Oil

Description: SRM 3080 consists of one 2-mL ampoule of SRM 3080, containing approximately 1.2 mL of a solution of aroclor 1260 in transformer oil.

Other Designations: Aroclor 1260 (PCB 1260; polychlornated biphenyl (aroclor 1260); chlorodiphenyl (60 % Cl)

in Transformer Oil (hydrotreated light napthenic distilltate; hydraulic petroleum oil)

Chemical Formula CAS Registry Number Name Transformer Oil complex mixture 64742-53-6 Aroclor 1260 complex molecule 11096-82-5

DOT Classification: Not Hazardous under DOT regulations.

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data	
Transformer Oil	99	ACGIH TLV-TWA: 5 mg/m³ (mineral oil mist)	
		Rat, Oral: LD ₅₀ : greater than 5 g/kg body weight	
		Rabbit, Acute Dermal: LD ₅₀ : greater than 5 g/kg body weight	
Aroclor 1260	1	NIOSH TWA: 1 μg/m³ (10 hours)	
		Rat, Oral: LD ₅₀ : 1315 mg/kg	
		Rabbit, Skin: LD _{LO} : 2 g/kg	

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Transformer Oil	Aroclor 1260	
Appearance and Odor: a clear liquid with a mild, bland petroleum odor	Appearance and Odor: a yellow solid; odor not available	
Relative Molecular Mass: ~255	Relative Molecular Mass: complex molecule	
Specific Gravity: 0.88 g/mL	Density (water = 1): 1.58	
Boiling Point: ~ 238 °C	Boiling Point: 385 °C to 420 °C	
Freezing Point: not available	Freezing Point: not available	
Vapor Pressure (@ 20 °C): < 0.01 mm Hg	Vapor Pressure (@ 20 °C): negligible	
Evaporation Rate: not available	Evaporation Rate: not available	
Viscosity (@ 40 °C): 12.0 cSt	Viscosity: not applicable	
Water Solubility: insoluble	Water Solubility: very slightly soluble	
Solvent Solubility: not available	Solvent Solubility: soluble in oils and organic solvents	

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this transformer oil/aroclor 1260 solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Transformer Oil

Flash Point: 146 °C Method Used: COC Autoignition Temperature: > 204 °C

Flammability Limits in Air (Volume %): UPPER: 7

LOWER: 0.9

Aroclor 1260

Flash Point: >385 °C Method Used: Not Available Autoignition Temperature: Not Available

Flammability Limits in Air (Volume %): UPPER: Not Available

LOWER: Not Available

Unusual Fire and Explosion Hazards: Transformer oil is a slight fire hazard. Heating this material greatly increases the fire hazard. Thermal oxidative degradation may also yield hazardous gases.

Aroclor 1260 is a slight fire hazard.

Extinguishing Media: Use a dry chemical powder, carbon dioxide, or foam. Use a water spray to cool fire exposed containers only. **DO NOT** use a forced water stream directly into an oil fire as this will only scatter the fire; use a smothering technique for extinguishing the fire of this combustible material.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

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SECTION V. REACTIVITY DATA					
Stability: X Stable	Unstable				
Conditions to Avoid: Avoid contact with heat, sparks, vapors or combustion by-products. Avoid contact with t sources.					
Incompatibility (Materials to Avoid): Transformer o oxidizing agents.	Incompatibility (Materials to Avoid): Transformer oil is a fire and explosion hazard when exposed to strong oxidizing agents.				
Aroclor 1260 is incompatible with oxidizing materials and	d combustible materials.				
See Section IV: Unusual Fire and Explosion Hazards					
Hazardous Decomposition or Byproducts: Transform oxides, and aldehydes along with other decomposition pro					
Thermal decomposition products of aroclor 1260 may halogenated compounds.	y include acid halides, chlorine	, oxides of carbon, and			
Hazardous Polymerization Will Occ	eur <u>X</u> V	Will Not Occur			
SECTION VI. HEALTH HAZARD DATA					
Route of Entry: X Inhalation	X Skin	X Ingestion			
Transformer Oil: The vapor pressure of this materic conditions is normally not a problem. However, health synthetic lubricants pose potential human health risks vexposure to liquids, vapors, mists, or fumes should be mi	studies have shown that many pet which may vary from person to p	roleum hydrocarbons and			
Prolonged or repeated skin contact with this product dermatitis; contact with the eyes may cause eye irritation skin of mice induced a moderate incidence of skin tumor amounts aspirated into the lungs during ingestion or vapossibly death.	n. Repeated application of mildly. This product has a low order of	y hydrotreated oils to the f oral toxicity, but minute			
PCB 1260 (Aroclor): PCBs show high levels of bio-ac especially for pentachloride (Cl) ₅ compounds and above. stages, dark pigmentation of the exposed pores. In the la potent liver toxins that can be absorbed through the skin or discomfort. This liver toxicity of chlorinated bipher tetrachloride at the same time. Where liver damage is higher the chlorine content of the diphenyl compound, the	The skin lesions consist of small tter stages, blackheads and pustule in hazardous amounts without immayls appears to be increased if the extensive, the patient may become	pimples and, in the initial es develop. The PCBs are mediately discernible pain ere is exposure to carbon			
Medical Conditions Generally Aggravated by Exposiskin disorders, and allergies. Aroclor 1260 may affect liv					
Listed as a Carcinogen/Potential Carcinogen (Transformer Oil):					
In the Notional Tarrials on Dua (NITD) D	Yes	No V			
In the National Toxicology Program (NTP) Report on In the International Agency for Research on Cancer (IA		<u>X</u>			
By the Occupational Safety and Health Administration	, e i	<u> </u>			

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Listed as a Carcinogen/Potential Carcinogen (Aroclor 1260):

In the National Toxicology Program (NTP) Report on Carcinogens

In the International Agency for Research on Cancer (IARC) Monographs

By the Occupational Safety and Health Administration (OSHA)

Yes

X

X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Transformer Oil: skin and upper respiratory tract (URT)

Aroclor 1260: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Protect containers from physical damage. Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C. Keep material in a well-ventilated area away from incompatible materials.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Transformer Oil*, 16 December 2002.

MDL Information Systems, Inc., MSDS Aroclor 1016, 22 March 2001.

MDL Information Systems, Inc., MSDS Aroclor 1232, 22 March 2001.

MDL Information Systems, Inc., MSDS Aroclor 1242, 22 March 2001.

MDL Information Systems, Inc., MSDS *Aroclor 1248*, 16 September 2002.

MDL Information Systems, Inc., MSDS Aroclor 1260, 16 December 2002.

Merck Index, 11th Ed., 1989.

The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are- given in the NIST Certificate of Analysis.

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